

a¹¹
coding a second ECC block for error correction separately from the first ECC block such that control information and ID information are disposed in the second ECC block, the first and second ECC blocks being coded independently for error correction;

modulating data of the first and second ECC blocks;

adding a synchronization signal to the modulated data such that the first and second ECC blocks are disposed in one physical structure; and

writing the modulated data with the synchronization signal to the optical disk.

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 8-18 are presently active. Claims 1-7 have been canceled without prejudice; and Claims 8-18 have been added by the present amendment. The additions to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, the specification was objected to regarding the use of the acronym "LDC"; Claim 3 was objected to under 37 C.F.R. § 1.75(c) as being an improper multiple dependent claim;³ Claim 7 was objected to as containing a minor informality; Claims 1-3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,949,326 to Takagi et al. (hereinafter "the '326 patent") in view of U.S. Patent No. 6,112,324 to Howe et al. (hereinafter "the '324 patent"); and Claims 4-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '326 and '324 patents, further in view of U.S. Patent No. 5,966,359 to Sako et al. (hereinafter "the '359 patent").

³ However, in a telephone discussion on April 17, 2003, Applicant's representative confirmed that the Examiner intended to object to Claim 4, not Claim 3, under 37 C.F.R. § 1.75(c). Moreover, in response to an inquiry by Applicant's representative, the Examiner stated that the objection to Claim 4 was in error.

In response to the objection to the specification, the specification has been amended on page 6 to clarify the meaning of the acronym LDC. Accordingly, the objection to the specification is believed to have been overcome.

Regarding the objection to the claims, Applicant respectfully submits that the objections to the claims are rendered moot by the cancellation of Claims 4 and 7 herein.

Applicant respectfully submits that the rejections of Claims 1-7 under 35 U.S.C. § 103 are rendered moot by the cancellation of those claims herein.

The present amendment also sets forth new Claims 8-18 for examination on the merits. Claims 8-18 are supported by the originally filed specification and do not add new matter.

New Claim 8 is directed to an optical disc having a data format, comprising: (1) user data and control information disposed in a first block; (2) ID information of a physical sector disposed in a second block. In addition, the first and second blocks are coded *independently* for error correction.

The '326 patent is directed to an optical information recording and reproducing system using optical discs having an error correction function. In particular, the '326 patent discloses the use of a spare or alternate area 16 for use in an error correcting method. However, the '326 patent fails to disclose user data and control information disposed in a first block, and ID information related to a physical sector disposed in a second block, wherein the first and second blocks are *independently coded for error correction*, as recited in new Claim 8.

The '324 patent is directed to a method of writing and reading to a compact disc. Regarding the '324 patent, the Office Action asserts that the '324 patent discloses an optical disc format for ID information, user data, and control information. However, Applicant respectfully submits that the '324 patent fails to disclose an optical disc having a data format

in which user data and control information are disposed in a first block, and ID information is disposed in a second block, wherein the first and second blocks are *independently coded for error correction*, as recited in Claim 8.

Thus, no matter how the teachings of the '324 and '326 patents are combined, the combination does not teach or suggest each of the limitations recited in new Claim 8. Accordingly, Applicant respectfully submits that new Claim 8 (and dependent Claim 9) patentably defines over the '324 and '326 patents.

New Claims 10 and 12 recite limitations analogous to the limitations recited in new Claim 8. Accordingly, for the reasons stated above for the patentability of Claim 8, Applicant respectfully submits that Claim 10 (and dependent Claim 11) and Claim 12 (and dependent Claim 13) patentably define over the '324 and '326 patents.

New Claims 14-17 recite the independently coded data formats recited in new Claims 10 and 12. Accordingly, for the reasons stated above for the patentability of Claim 8, Applicant respectfully submits that new Claims 14-17 patentably define over the '324 and '326 patents.

New Claim 18 is directed to a method of writing to an optical disk, comprising, inter alia: (1) coding a first ECC block for error correction with user data disposed in the first ECC block; (2) coding a second ECC block for error correction, such that control information and ID information are disposed in the second ECC block, wherein the first and second ECC blocks are coded independently for error correction; and (3) modulating data of the first and second ECC blocks. Accordingly, for the reason stated above for the patentability of Claim 8, Applicant respectfully submits that new Claim 18 patentably defines over the '324 and '326 patents.

The '359 patent is directed to a data recording/reproducing apparatus and method corresponding to a plurality of data formats. However, Applicant submits that the '359 patent

fails to remedy the deficiencies of the '324 and '326 patents, as discussed above.

Accordingly, Applicant respectfully submits that new Claims 8-17 patentably define over the further combination of teachings of the '326 patent in view of the '324 patent further in view of the '359 patent.

Thus, it is respectfully submitted that independent Claims 8, 10, 12, and 14-17 (and all associated dependent claims) patentably define over the noted combinations of teachings of the '324, '326, and '359 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith, is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

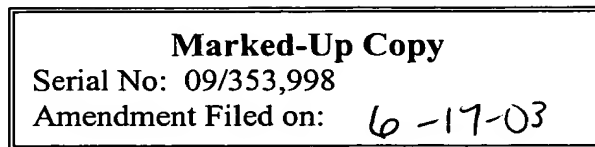


Gregory J. Maier
Attorney of Record
Registration No. 25,599
Surinder Sachar
Registration No. 34,423



22850

Tel.: (703) 413-3000
Fax: (703) 413-2220
GJM/MRC/KMB/cja
I:\atty\kmb\203654US-am.doc



IN THE SPECIFICATION

Please amend the title of the invention as follows:

OPTICAL DISC, METHOD OF [WRITE] WRITING TO [SAME] AN OPTICAL DISC,
AND METHOD OF [READ] READING FROM [SAME] AN OPTICAL DISC

Please amend the paragraph on page 1, lines 5-7 as follows:

The present invention relates to an optical disc unproved in data format including a user data, ID information and control information, a method of [write] writing to the optical disc and a method of [read] reading from the optical disc.

Please amend the paragraph on page 1, lines 10-15 as follows:

In the conventional optical disc, a user data, ID information, and control information are coded as one block for error correction, and the coded data are modulated, and a sync signal is added to the modulated data for [write] writing to the optical disc. Generally, the user data has been pre-coded for an error correction (EDC is added to the user data) separately from the above-mentioned error-correcting coding.

Please amend the paragraph on page 1, beginning at line 18 to page 2, line 4 as follows:

FIG. 2 shows a data format for a DVD, as an example. In this data format, one sector contains a 2-kB user data, control and ID information, and EDC information. One block

consists of 16 sectors, and an information word containing 16 sectors of user data, control and ID information, and EDC information is coded for error correction (parity is added). In the DVD, RSPC (Reed Solomon product code) is used as correcting code (in this respect, this data format for the DVD is [difference] different from that shown in FIG. 1). Assume here that the line direction is C1 and the row direction is C2. C1 is RS (182, 172, 11) while C2 is RS (208, 192, 17).

Please amend the paragraph on page 2, beginning at line 17 to page 3, line 3 as follows:

For [read] reading from the optical disc, an FS signal is used for frame synchronization, then ID information is used for sector synchronization. Thus, the data position in one block is known. So, the ID information has to be disposed in a direction of data on the optical disc. Also, it has to be disposed in the same position in each physical sector. FIG. 3 shows the ID information positioned at the head of each physical sector, for example. On the DVD, the direction of user data is the same as on the optical disc. It should be noted that the operations such as scramble will not be described herein.

Please amend the paragraph on page 3, lines 4-21 as follows:

Recently, an optical disc having a [lager] larger capacity and a higher transfer rate and a disc drive for such an optical disc are demanded for use to store dynamic images, etc. In particular, recordable type and rewritable disc systems have to be of a rather large capacity to assure a sufficient quality of an image since the image information cannot easily be real-time compressed at [a] high efficiency, [which depends] depending upon the content thereof. For such a larger capacity of the optical disc, there are available methods such as increased NA (numerical aperture) of the optical system for data write and/or read and decrease in thickness

of the disc substrate to assure a sufficient skew margin, etc. However, since the increase [of] in capacity will lead to a higher recording density of the optical disc and the decrease in the thickness of the disc substrate will cause the disc to be adversely affected by dust, it is desirable to assure the larger capacity of the optical disc by improving the capability of error correction. The optical disc should desirably be strong [again] against a burst error, among others. On the other hand, for a larger capacity of the optical disc, the coding efficiency should not be [much] too low. For these purposes, it has been proposed to enlarge the error-correcting code, namely, to increase the size of the ECC block. However, it is difficult to use the normally used PC (product code) of GF (2^8) in a larger ECC block than used in the DVD technology, for example, an ECC block containing more than 64 kB of user data.

Please amend the paragraph at page 5, lines 11-12 as follows:

One block of data is equivalent to 32 physical sectors on the optical disc. One physical sector on the optical disc consists of 10 frames, each of 240-byte data.

Please amend the paragraph at page 5, lines 13-19 as follows:

For [read] reading from the optical disc, an FS signal is used for frame synchronization, then ID information is used for sector synchronization. Thus, the data position in one block is known. So, the ID information has to be disposed in a direction of data on the optical disc. Also, [it] the ID information has to be disposed in the same position in each physical sector[, and also in the same position in each of the physical sectors]. As shown in FIG. 5, the ID information is positioned at the head of each physical sector, for example.

Please amend the paragraph on page 6, lines 6-12 as follows:

As mentioned above, for providing a large-capacity, high transfer-rate optical disc format and optical disc drive, it may be possible to provide the interleave length, enhance the error-correcting capability by using an error-correcting code of a [large] long code distance (LDC), and raise the writing and reading speed by disposing the error-correcting code in the same direction as user data. In this case, however, since parities in ID information and user data [interference] interfere with each other, it is not easy to form such a data format.

Please amend the paragraph on page 6, lines 14-20 as follows:

Accordingly, an object of the present invention [has an object] is to overcome the above-mentioned drawbacks of the prior art by providing (1) an optical disc [whose] in which the data format including a user data, ID information, and control information is improved so that a same direction can be selected for disposition of the user data and control information as well as for error-correcting code, with no care about parities in the error-correcting codes for the ID information and user data[,]; (2) a method of [write] writing to the optical disc; and (3) a method of [read] reading from the optical disc.

Please amend the paragraph on page 7, lines 12-15 as follows:

[Yes] Yet further, the above object can be attained by providing an optical disc having each of the data formats in which an error-correcting code whose code distance is long (LDC) in one direction and the user data is arranged in the same direction as the error-correcting code.

IN THE CLAIMS

1-7. (Cancelled)

8-18. (New)